



Norman H. Bangerter
Governor

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State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340

September 8, 1992

TO: Minerals File

FROM: Tony Gallegos, Reclamation Engineer *aa*

RE: Site Inspection, FS Industries, Ltd. (FSI), Vernal Phosphate Operations Mine, M/047/007, Uintah County, Utah

Date of Inspection: September 2, 1992
Time of Inspection: 0900 - 1215
Conditions: Fair, sunny
Participants: Ron Ryan, Gene Schamber, FSI; Tony Gallegos, DOGM

The purpose of this inspection was to assess the current status of the operation and evaluate the reclamation surety estimate for adequacy, prior to the 5 year renewal. The last site inspection performed by the Division was in August 1990. Mr. Ron Ryan is now the person in charge of environmental affairs at the Vernal Phosphate Operations and all future correspondence should be addressed to him.

We first visited the Camp Canyon area. This area had been partially released in 1987 by the Division. The partial release was used to reflect the completion of the regrading/earthwork and the initiation of the three-year revegetation success monitoring period used by the Division. This area is predominately occupied by alfalfa and grasses. The vegetation density is estimated at this time to be beyond the 70% of premining cover rule used by the Division. The plants and area shows signs of heavy grazing by elk. Photographs were taken of some revegetated slopes in this area.

The tailings pond area was visited next. A portion of the older pond area had been drill seeded some time ago as an experiment. This seeded area shows some plant success. It was pointed out that the old area contained layers of different material sizes and types, whereas, the newer pond area will contain material of one size, approximately -200 mesh. The tailings dam was being raised at the time of this inspection and is projected to be an ongoing project for several years. The tailings material is being cycloned to recover sands for use in the pond drainage system. The Division has not received a plan for final

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Site Inspection
FS Industries
M/047/007
September 8, 1992

reclamation of the tailings area at this time. Mr. Ryan expressed interest in developing some plans for reclamation of the tailings along with the development of some test plots. I recommended that he contact Holland Shepherd of the Minerals staff for some guidelines in developing test plots and the reclamation plan.

Panel C was visited next. A portion of this area was fully released in 1987 and a portion was partially released. The partially released area appears to have satisfied the 70% premining cover requirement at this time. Mr. Schamber indicated that this area had been planted with tree saplings, although none were evident. He indicated that the saplings were heavily favored by the elk soon after they were planted.

Panel D was visited since it had been revegetated some time ago, although it was not included in the 1987 bond release. This area appears to have satisfactory revegetation success.

Mr. Schamber felt that a key part of the revegetation success on reclaimed areas was the replacement of topsoil material as soon as possible after initial stripping. He felt that this time period should be no longer than six months for best results.

The inspection concluded with the understanding that the Division will evaluate the existing bond calculations taking into account those areas which can now be released from reclamation. Mr. Ryan will provide the Division with a summary listing of those areas which are candidates for reclamation release and a 5 year projection for the maximum area of disturbance to assist in the bond evaluation. FSI will be informed of the results of that evaluation in the form of a letter. A copy of the original reclamation cost estimate and estimate reduction will be sent to Mr. Ryan along with a copy of this memo.

jb
cc: Ron Ryan, FSI w/attachments




STATE OF UTAH
NATURAL RESOURCES
Oil, Gas & Mining

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355 W. North Temple • 3 Triad Center • Suite 350 • Salt Lake City, UT 84180-1203 • 801-538-5340

July 22, 1987

TO: Frank Jensen, Reclamation Soil Specialist
FROM: Frank J. Filas, Reclamation Engineer 
RE: Calculation of Bond Release, Vernal Phosphate Mine, M/047/007

I. Full Bond Release - 270.5 Acres

Description	Acres	Adjusted* Cost/Acre	Total
Panel A (1975-1983)	83.0	\$2396	\$198,868
Panel A (1983-Present)	124.0	2396	297,104
Panel C	45.0	2396	107,820
Misc. Areas	18.5	1668	30,858
Total	270.5		\$634,650

II. Partial Bond Release - 127 Acres

Description	Acres	Adjusted* Cost/Acre	Revegetation Cost/Acre	Release Cost/Acre	Total
Panel C	73	\$2396	\$411	\$1985	\$144,905
Camp Canyon	54	2396	411	1985	107,190
Total	127				\$252,095

*1985 cost/acre adjusted for 3.79 percent inflation factor and 15 percent contingency.

III. Total Amount of Bond Release

Full	\$634,650
Partial	252,095
Total	\$886,745

Rounded to Nearest \$1000 = \$887,000

IV. New Bond to be Posted

Current Bond	\$4,700,000
Bond Release	887,000
New Bond	\$3,813,000

clj
1212R/44

BOND ESTIMATE SUMMARY FOR THE VERNAL PHOSPHATE PROJECT
CHEVRON RESOURCES COMPANY
ACT/047/008-
007

Estimate Updated as of November 1985 - J.R. Harden

BOND ESTIMATE SUMMARY

RECLAMATION COSTS:

Description	Acres	Cost	Cost / Acre
Camp Canyon	54	\$ 93,491	\$ 1,730 / ac
Panel "A"	83	\$ 143,611	\$ 1,730 / ac
Panel "C"	122	\$ 211,132	\$ 1,730 / ac
Plant Facilities/Concentrator Area	50	\$ 40,246	\$ 805 / ac
SAG Mill Area	66	\$ 48,459	\$ 734 / ac
Tailings Pond: Impounded Material	345	\$ 140,841	\$ 408 / ac
Tailings Pond: Miscellaneous Areas	91	\$ 109,532	\$ 1,204 / ac
Roads	68	\$ 40,258	\$ 592 / ac
Add'l. Mining Dist. Thru 1989	1130	\$ 1,954,900	\$ 1,730 / ac
Pipeline Leaving Property	7.5	\$ 2,332	\$ 311 / ac
Conveyor w/Tunnel to Panels D & E	3.5	\$ 1,963	\$ 561 / ac
Access Road to Panels D and E	5.5	\$ 3,223	\$ 586 / ac
<hr/>			
SUBTOTALS -	2,025.5	\$ 2,789,988	

DEMOLITION COSTS:

IX. Bonding (Amended January, 1984)	\$ 449,752
Revised MRP (August, 1984)	\$ 152,669
<hr/>	
SUBTOTAL -	\$ 602,427

TOTAL ESTIMATE IN 1985 DOLLARS:

RECLAMATION COSTS	\$ 2,789,988
DEMOLITION COSTS	\$ 602,427
<hr/>	
Subtotal	\$ 3,392,415
Add 15% Contingency	\$ 508,862
<hr/>	
TOTAL ESTIMATE IN 1985 DOLLARS	\$ 3,901,277

November 1985
ACT/047/008
Bonding Estimate

Page 2 of 10.

BOND ESTIMATE SUMMARY FOR THE ANNUAL ESCALATION
SCHEDULE RESOURCE REQUIREMENTS

ESCALATION SCHEDULE @ 3.79% PER YEAR (MEANS COST INDEX):

1985\$	\$ 3,901,277
1986\$	\$ 4,049,135
1987\$	\$ 4,202,597
1988\$	\$ 4,361,876
1989\$	\$ 4,527,191
1990\$	\$ 4,698,771

RECLAMATION CO

1990\$ ROUNDED TO THE NEAREST \$1000 - \$ 4,699,000

Description

Amount

=====

TOTAL BOND AMOUNT REQUIRED IN 1990\$ IS \$ 4,699,000

=====

The Operator may provide full bond in the amount required in 1990\$ for the full five year term, or, submit annual bond amounts equivalent to the escalation schedule for the next years dollars. That is, for 1985, the Operator would have to provide as a minimum bond, the amount given in 1986\$.

UNIT COSTS FOR EQUIPMENT

Equipment costs are based on the Rental Rate Blue Book for Construction Equipment. Labor costs are based on the Means Site Work Cost Data 1985. Other Reclamation work as is required but is not contained in the above references will be cited as they occur.

Due to the extent of the reclamation work at Chevron Phosphate, all equipment costs will be based on the monthly Blue Book rates and converted to hourly costs. Costs for the equipment will include the required hourly maintenance on operating costs.

====Total adjusted hourly costs for equipment selected in the estimate are as follows:

1. D-4 DOZER (Cat D-4E)

Monthly Cost \$ 2,810.00

Adjusted Hourly Cost per Hour

\$ 15.97

Operating Cost per Hour

\$ 6.65

Operator Cost per Hour

\$ 29.25

TOTAL HOURLY COST FOR D-4 DOZER

\$ 51.87
=====

2. D-7 DOZER (Cat D-7G)

Monthly Cost \$ 8,700.00

Adjusted Hourly Cost per Hour

\$ 49.43

Operating Cost per Hour

\$ 20.35

Operator Cost per Hour

\$ 29.25

TOTAL HOURLY COST FOR D-7 DOZER

\$ 99.03
=====

3. D-9 DOZER (Cat D-9L)

Monthly Cost \$ 16,700.00

Adjusted Hourly Cost per Hour

\$ 94.89

Operating Cost per Hour

\$ 43.05

Operator Cost per Hour

\$ 29.25

TOTAL HOURLY COST FOR D-9 DOZER

\$ 167.19
=====

4. 200 40 TON CRANE (P&H Omega 40)

Monthly Cost	\$ 11,680.00
Adjusted Hourly Cost per Hour	\$ 66.36
Operating Cost per Hour	\$ 27.40
Operator Cost per Hour	\$ 54.65 (Crane Op. & Oilier)

Due to TOTAL HOURLY COST FOR 40 TON CRANE at Operator Prostrate \$ 148.41
=====

hourly cost. Costs for the equipment will include the required operator
5000 2 YD. LOADER (Cat 930)

Monthly Cost	\$ 3,995.00
Adjusted Hourly Cost per Hour	\$ 22.83
Operating Cost per Hour	\$ 10.45
Operator Cost per Hour	\$ 29.25

=====

TOTAL HOURLY COST FOR 2 YD. LOADER \$ 62.53
=====

6. 633 D SCRAPER

Monthly Cost	\$ 20,625.00
Adjusted Hourly Cost per Hour	\$ 117.19
Operating Cost per Hour	\$ 51.75
Operator Cost per Hour	\$ 29.25

=====

TOTAL HOURLY COST FOR 633 D SCRAPER \$ 198.19
=====

7. Tractor Trailer (Rear Loading Drop Deck, Triple Axle, 40 T Cap
Trailer with 6x4 Diesel 45-55,000 GVW Tractor))

Monthly Cost	\$ 4,755.00
Adjusted Hourly Cost per Hour	\$ 27.02
Operating Cost per Hour	\$ 15.55
Operator Cost per Hour	\$ 23.20

=====

TOTAL HOURLY COST FOR \$ 65.77
=====

OTHER RATES AND COSTS USED

Common Laborers (Means)	\$ 22.40	per hour
Supervisors (Means)	\$ 32.20	per hour
Welders (Means)	\$ 33.50	per hour
Operators (Means)	\$ 29.95	per hour
Seed Mix (Avg. Seed+Seedlings)	\$ 185.00	per acre
Mulch (Lynn Kunzler, DOGM) ON CRANE	\$ 70.00	per ton
Fertilizer @ 50#/ac (Operator)	\$ 45.00	per acre
Power Mulcher (Means)	\$ 98.00	per acre

QUANTITIES, PRODUCTIVITY AND EQUIPMENT SELECTION

Operator estimates for quantities, productivity and equipment selection were used to the extent as was considered reasonable by the Division. Significant changes to the estimate provided by Chevron are summarized below:

- Supervisors were added to the revegetation/reclamation activities. The duration for supervision was based on the equipment selected with the lowest productivity.
- Seeding and fertilizing was accomplished using a D-4 Crawler Tractor with appropriate equipment rather than a farm type tractor. This selection was made based on the rolling and rugged terrain expected during reclamation. Similarly, revegetation of the tailings materials may prove difficult with rubber-tired equipment due to the nature of the tailings materials.
- Additional contouring work was added to the tailing pond impoundment structure, borrow and miscellaneous areas. This would be required to fill in the ponds, round crests of embankments and blend the disturbed area with the adjacent undisturbed areas where needed.
- Escalation was added to account for the increased costs of construction. The Division uses Means Cost Data to accomplish this and has incorporated escalation into all bonding calculations for all mines. Minimum bonding requirements are for the bond to equal the amount escalated to the next year's dollars for the current year.

The following reclamation costs are updated from IX. Bonding (Amended January, 1984):

Camp Canyon - 54 acres

Supervisor @ 36 days	\$ 9,274	
Contouring, D-9, @ 1.5 ac/day	\$ 48,151	
Topsoil, 633-D, @ 4.0 ac/day	\$ 21,405	
Seed & Fertilizing, D-4, @ 10.0 ac/day	\$ 2,241	
Seed @ \$185.00/ac	\$ 9,990	net 14,661
Fertilizer @ 50#/ac	\$ 2,430	
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	\$ 93,491	\$ 1,730 / ac

Operator estimates for quantity of seed and fertilizer are based on 15.7%
Panel "A" - 83 acres

Supervisor @ 55 days	\$ 14,168	
Contouring, D-9, @ 1.5 ac/day	\$ 74,009	
Topsoil, 633-D, @ 4.0 ac/day	\$ 32,900	
Seed & Fertilizing, D-4, @ 10.0 ac/day	\$ 3,444	
Seed @ \$150.00/ac	\$ 15,355	
Fertilizer @ 50#/ac	\$ 3,735	
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	\$ 143,611	\$ 1,730 / ac

Panel "C" - 122 acres

Supervisor @ 81 days	\$ 20,866	
Contouring, D-9, @ 1.5 ac/day	\$ 108,785	
Topsoil, 633-D, @ 4.0 ac/day	\$ 48,358	
Seed & Fertilizing, D-4, @ 10.0 ac/day	\$ 5,063	
Seed @ \$185.00/ac	\$ 22,570	
Fertilizer @ 50#/ac	\$ 5,490	
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	\$ 211,132	\$ 1,730 / ac

Plant Facilities/Concentrator Area - 50 acres

Supervisor @ 17 days	\$ 4,379	
Ripping, D-9, @ 3.0 ac/day	\$ 22,292	
Seed & Fertilizing, D-4, @ 10.0 ac/day	\$ 2,075	
Seed @ \$185.00/ac	\$ 9,250	
Fertilizer @ 50#/ac	\$ 2,250	
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	\$ 40,246	\$ 805 / ac

SAG Mill Area - 66 acres

Supervisor @ 17 days	\$ 4,379	
Can Topsoil, 633-D, @ 4.0 ac/day	\$ 26,161	
Seed & Fertilizing, D-4, @ 10.0 ac/day	\$ 2,739	
Seed @ \$185.00/ac	\$ 12,210	
Fertilizer @ 50#/ac	\$ 2,970	
Topsoil, 633-D, @ 4.0 ac/day		
Seed & Fertilizing, D-4, @ 10.0 ac/day	\$ 48,459	\$ 734 / ac
Seed @ \$185.00/ac		
Fertilizer @ 50#/ac		

Tailings Pond: Impounded Material - 345 acres

Supervisor @ 35 days	\$ 9,016	
Discing, D-4, @ 10.0 ac/day	\$ 14,316	
Seed & Fertilizing, D-4, @ 10.0 ac/day	\$ 2,739	
Mulching, Power Mulcher @ 24ac/day	\$ 11,270	
Seed @ \$185.00/ac	\$ 63,825	
Fertilizer @ 50#/ac	\$ 15,525	
Mulch, @ 1 ton /ac	\$ 24,150	
	\$ 140,841	\$ 408 / ac

Tailings Pond: Structure/Borrow/Miscellaneous Areas - 91 acres

Supervisor @ 30 days	\$ 7,728	
Contouring, D-9, @ 3.0 ac/day	\$ 40,572	
Topsoil, 633-D, @ 4.0 ac/day	\$ 36,071	
Seed & Fertilizing, D-4, @ 10.0 ac/day	\$ 3,776	
Seed @ \$185.00/ac	\$ 16,835	
Fertilizer @ 50#/ac	\$ 4,550	
	\$ 109,532	\$ 1,204 / ac

Roads - 68 acres

Supervisor @ 14 days	\$ 3,606	
Ripping, D-9, @ 5.0 ac/day	\$ 18,190	
Seed & Fertilizing, D-4, @ 10.0 ac/day	\$ 2,822	
Seed @ \$185.00/ac	\$ 12,580	
Fertilizer @ 50#/ac	\$ 3,060	
	\$ 40,258	\$ 592 / ac

The following reclamation costs are updated from the bonding calculations for the Revised Mine and Reclamation Plan of Vernal Phosphate operations, submitted in August, 1984:

Additional Disturbance From 1984 thru 1989

<u>YEAR</u>	<u>ACREAGE</u>
1984-85	W 80 E 180
1986	W 70 E 100
1987	W 90 E 110
1988	W 90 E 140
1989	W 70 E 200
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TOTAL	1130 Acres

Estimate @ \$1730 / ac
(Average Reclamation Cost for Mined Areas)

\$ 1,954,900

The following reclamation costs are updated from the bonding calculations for the Revised Mine and Reclamation Plan of Vernal Phosphate operations, submitted in August, 1984:

Pipeline Leaving Property - 7.5 acres

Supervisor @ 1 day	\$ 258
Seed & Fertilizing, D-4, @ 10.0 ac/day	\$ 311
Seed @ \$185.00/ac	\$ 1,388
Fertilizer @ 50#/ac	\$ 375
<hr/>	
	\$ 2,332
<hr/>	

\$ 311 / ac

Conveyor w/ Tunnel to Panels D and E - 3.5 acres

Supervisor @ 1 day	\$ 258	
Seed & Fertilizing, D-4, @ 10.0 ac/day	\$ 311	
Power Mulching	\$ 343	
Seed @ \$185.00/ac	\$ 648	
Fertilizer @ 50#/ac	\$ 158	
Mulch @ 1 ton /ac	\$ 245	
1985	<u>\$ 1,963</u>	\$ 561 / ac

Access Road to Panels D and E - 5.5 acres

Supervisor @ 1 day-	\$ 258	
Ripping, D-9, @ 5.0 ac/day	\$ 1,471	
Seed & Fertilizing, D-4, @ 10.0 ac/day	\$ 228	
Seed @ \$185.00/ac	\$ 1,018	
Fertilizer @ 50#/ac	\$ 248	
	<u>\$ 3,223</u>	\$ 586 / ac

DEMOLITION COSTS

The following demolition costs are updated from IX. Bonding (Amended January, 1984):

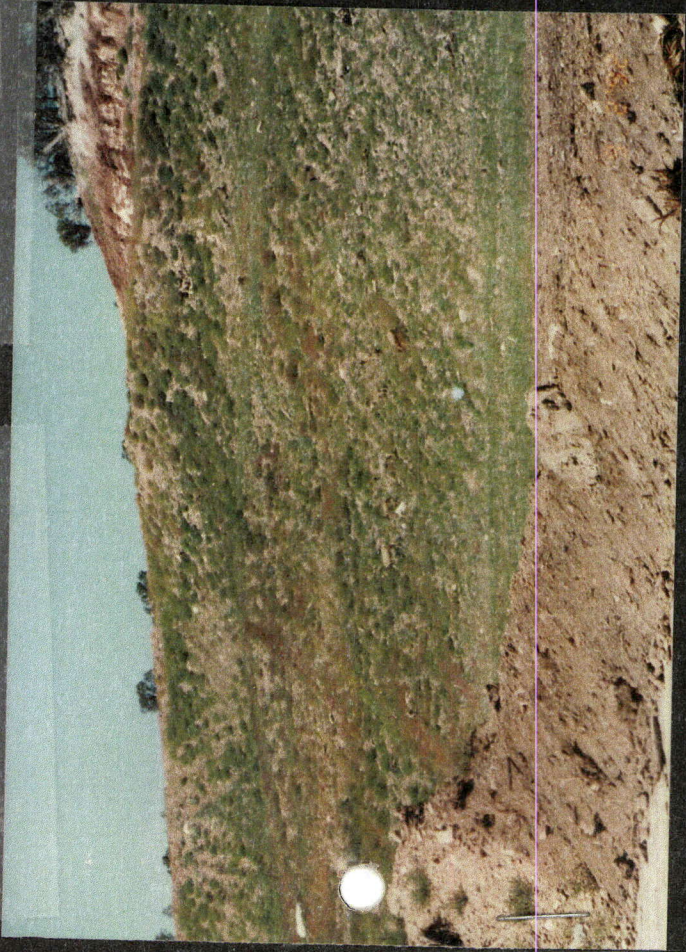
ACTIVITY	MAN/EQUIPMENT DAYS	UNIT COST/DAY	TOTAL
Supervisors	140	\$ 257.60	\$ 36,064
Laborers	851	\$ 179.20	\$152,499
Welders	150	\$ 268.00	\$ 40,200
Crane w/ Operator	75.75	\$ 1,187.28	\$ 89,936
D-7 Dozer	10.5	\$ 792.24	\$ 8,319
Tractor Trailer	151.50	\$ 526.16	\$ 79,713
Front End Loader	86.00	\$ 500.24	\$ 43,021
		TOTAL	<u>\$ 449,752</u>

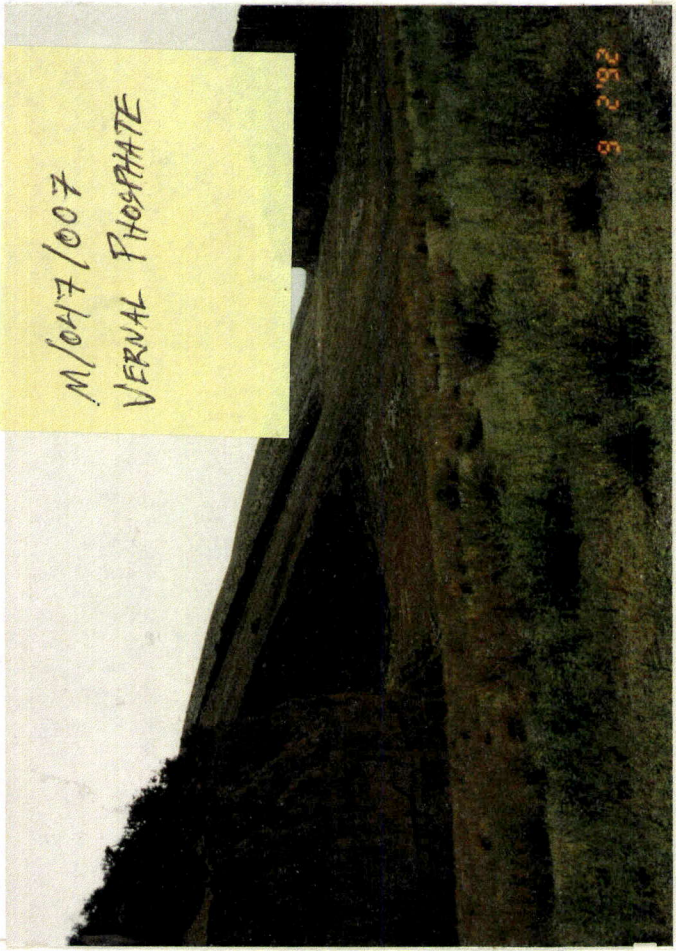
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ACTIVITY	MAN/EQUIPMENT DAYS	UNIT COST/DAY	TOTAL
Supervisors	84	\$ 257.60	\$ 18,032
Laborers	425	\$ 179.20	\$ 62,720
Welders	40	\$ 268.00	\$ 10,720
Crane w/ Operator	25	\$ 1,187.28	\$ 29,682
D-7 Dozer	4	\$ 792.24	\$ 3,169
D-9 Dozer	5	\$ 1,337.52	\$ 6,688
Tractor Trailer	30	\$ 526.16	\$ 13,154
Front End Loader	22	\$ 500.24	\$ 8,504
		TOTAL	\$ 152,669

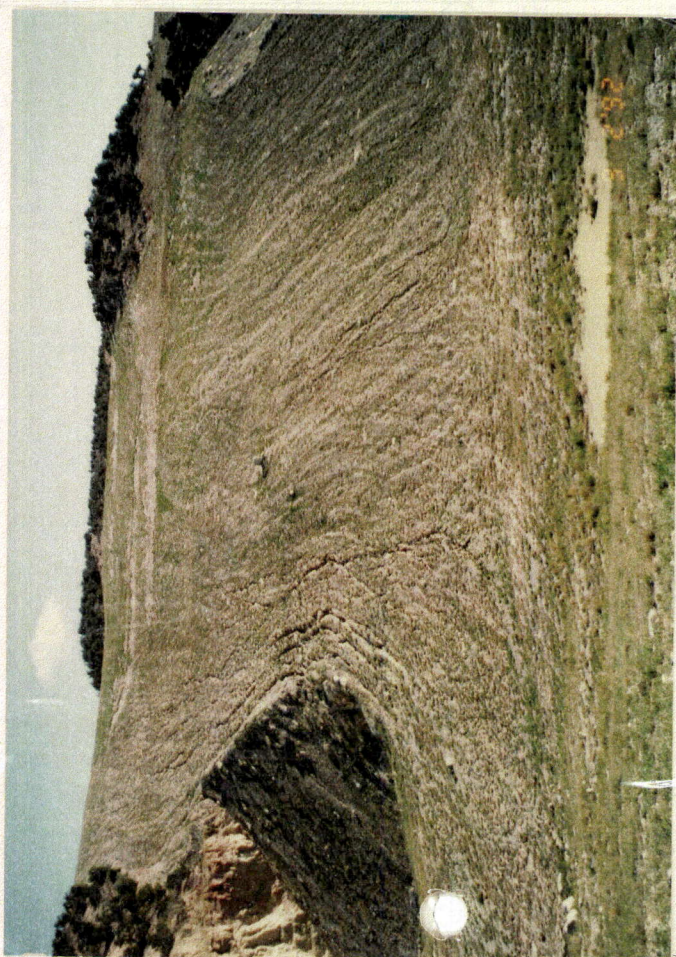
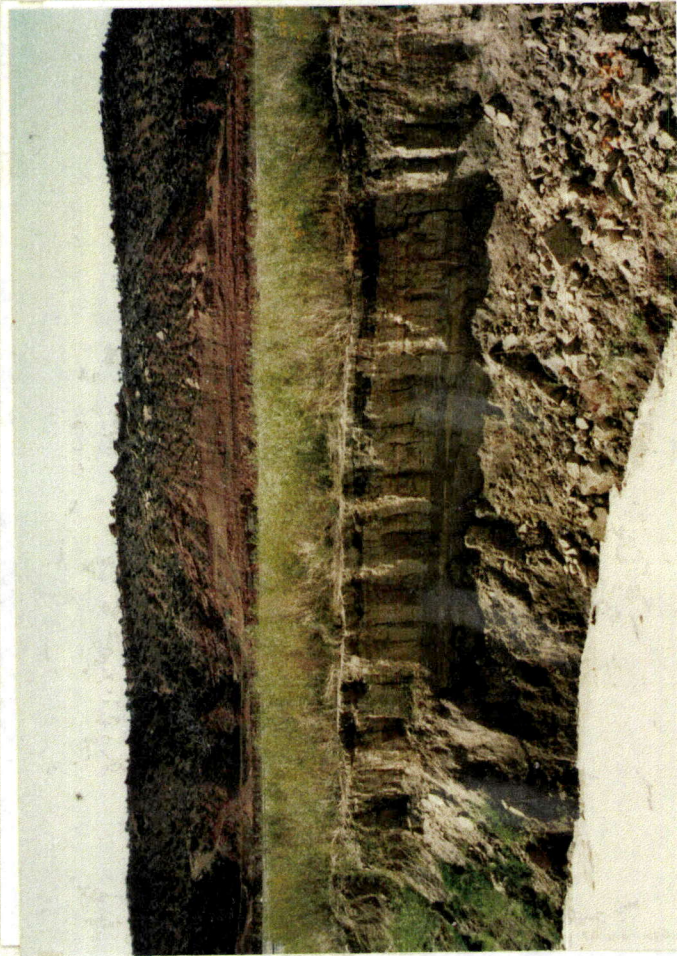
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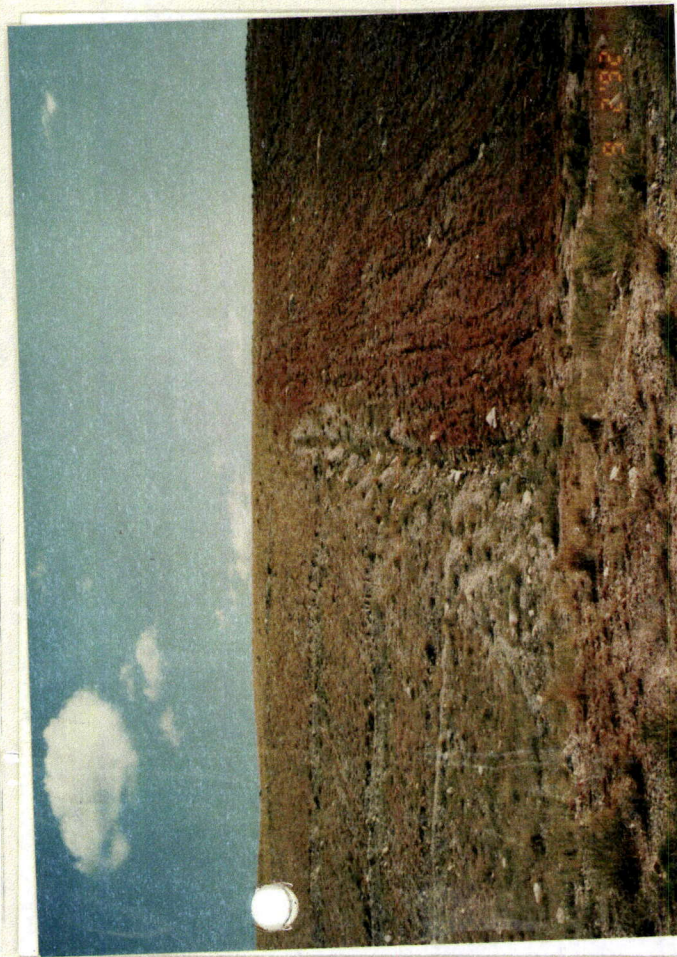


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VERNAL PHOSPHATE

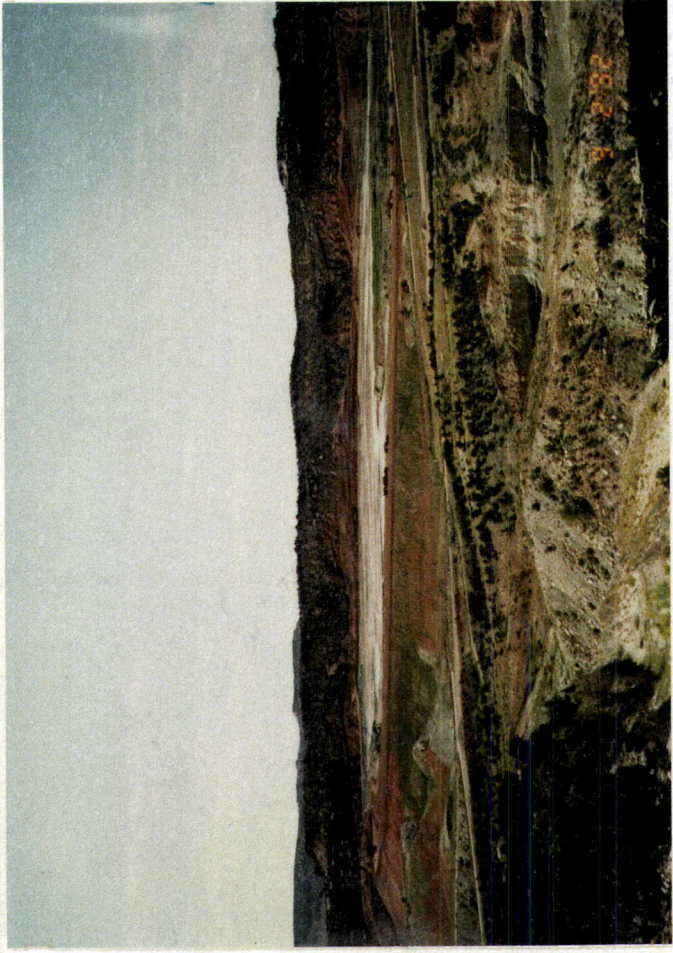
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11/04/77/007
 CAMP CANYON
 REVEGETATED SLOPE

